



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

November 14, 2008

Division: 5
County: Durham
Sig. Inv. No.: 05-1012 and 05-1013
Work Order No.: N/A
Description: SR 1445 (Duke Street) at SR 1750 (Morgan Street); SR 1445 (Duke Street) at Main Street

MEMORANDUM

TO: Mr. Steve Johnson
Division Traffic Engineer

FROM: Boniface A. Maduabuchukwu, PE
Central Region Signals Engineer

Boniface Madu

SUBJECT: Transmittal of Acceptable Traffic Signal Plan

Attached are final sealed copies of the plans for the traffic signal at the above-described location. These signal plans were prepared by Kimley-Horn & Associates, Inc.

In addition to the requirements of these approved plans, attention is directed to the fact that all work must be performed in accordance with applicable sections of the latest generic project special provisions maintained by the Intelligent Transportation Systems and Signals Unit. The generic project special provisions contain the latest up-to-date revisions to the 2006 Roadway Standard Specifications for Road and Structures, and may be accessed through the department's web site at:
"[http:// www.ncdot.org/doh/preconstruct/traffic/itss](http://www.ncdot.org/doh/preconstruct/traffic/itss)".

By copy of this memo, it is requested that Kimley-Horn & Associates forward CADD files of this project to the Signals and Geometrics office.

If further assistance is needed, please contact Cheryl J. Collins or me at (919) 773-2800.

BAM:cjc

Attachments

cc: J. Wally Bowman, PE
Kelly L. Becker, PE
Robert Lynch
Philip Loziuk, PE, City of Durham
Jerry Cross, Kimley-Horn & Associates, Inc.

MAILING ADDRESS:
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH
1561 MAIL SERVICE CENTER
RALEIGH NC 27699-1561

TELEPHONE: 919-773-2800
FAX: 919-771-2745

WEBSITE: WWW.NCDOT.ORG

LOCATION:
750 NORTH GREENFIELD PARKWAY
GARNER NC 27529



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

UTILITIES COORDINATION UNIT
1591 MAIL SERVICE CENTER RALEIGH N C 27699-1591
PHONE (919) 250-4128 FAX (919) 250-4151

LYNDO TIPPETT
SECRETARY

November 5, 2008

COUNTY: Durham

SUBJECT: Encroachment Contract – City of Durham

Mr. Patrick W. Baker
City Manager
City of Durham
101 City Hall Plaza
Durham, North Carolina 27701

Dear Mr. Baker:

Attached for your files is a copy of Right of Way Encroachment Contract properly executed. This contract covers the following:

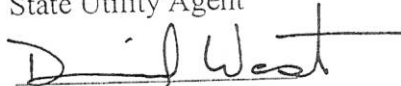
Installation of Grading, Drainage, Paving, Curb and Gutter, Sidewalk, Signing, Signals, Traffic Control, Pavement Marking and Landscaping for Downtown Durham Street Improvements to US 70 Business (Main Street), SR 1445 (Duke Street) and US 70 Business West (Morgan Street) as shown on the attached plans (with revisions as required by NCDOT).

APPROVED SUBJECT TO: Attached Special Provisions

Sincerely,

J. Robert Memory
State Utility Agent

BY:


David West
Encroachment Agent

JRM/DW

Attachment

cc: J. W. Bowman, PE, Division Engineer (copy of contract)
T. N. Johnson, PE, District Engineer (copy of contract)
C. A. Nuckols, PE, Kimley-Horn and Associates, Inc. (copy of contract)

SPECIAL PROVISIONS

16. 1B
City of Durham
(363)

1. NCDOT WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM

The North Carolina Department of Transportation is in the process of developing a Work Zone Traffic Control Qualification & Training program that will begin its implementation in 2009. This program will require qualified and trained Work Zone Flaggers in every flagging operation (July 2009), qualified and trained Work Zone Traffic Control Installers on every traffic control installation (January 2010) and qualified and trained Work Zone Traffic Control Supervisors on Significant Projects (July 2010). It is intended for the program to include anyone working within NCDOT Right of Way including work associated with NCDOT construction and encroachment agreements as well as all NCDOT operations.

Training for this certification will be provided by NCDOT approved training sources and/or private entities that have been pre-approved to train themselves. Additional information will be provided as this program progresses. If you have questions, contact our web site at www.ncdot.org/-wztc, or contact Meredith McDiarmid, P.E. with NCDOT Work Zone Traffic Control Unit at (919) 250-4159 or mmcdiarmid@dot.state.nc.us

2. The encroaching party shall notify the District Engineer's office (telephone (919) 220-4750 prior to beginning construction and after construction is complete.
3. An executed copy of this encroachment agreement shall be present at the construction site at all times during construction. If safety or traffic conditions warrant such an action, NCDOT reserves the right to further limit, restrict or suspend operations within the right of way.
4. NCDOT does not guarantee the right of way on this road, nor will it be responsible for any claim for damages brought about by any property owner by reason of this installation.
5. The encroaching party is required to contact the appropriate Utility Companies involved and make satisfactory arrangements to adjust the utilities in conflict with the proposed work prior to beginning construction.
6. Excavation within 500 feet of a signalized intersection will require notification by the party of the second part to Steve Johnson, the Division Traffic Engineer at telephone number (919) 220-4600. All traffic signal or detection cables must be located prior to excavation. Cost to replace or repair NCDOT signs, signals, or associated equipment shall be the responsibility of the encroaching party.
7. The encroaching party shall comply with all applicable Federal, State and local environmental regulations and shall obtain all necessary Federal, State and local environmental permits, including but not limited to, those related to sediment control, stormwater, wetland, streams, endangered species and historical sites
8. The contractor shall not begin the construction until after the traffic control and erosion control devices have been installed to the satisfaction of the District Engineer.
9. Trenching, bore pits and/or other excavations shall not be left open or unsafe overnight. The Contractor shall comply with all OSHA requirements and provide a competent person on site to supervise excavation at all times.

10. All fill areas/backfill shall be compacted to 95% density in accordance with AASHTO T99 as modified by the NCDOT. All material to a depth of 8 inches below the finished surface of the subgrade shall be compacted to a density equal to at least 100% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. The subgrade shall be compacted at a moisture content which is approximately that required to produce the maximum density indicated by the above test method. The contractor shall dry or add moisture to the subgrade when required to provide a uniformly compacted and acceptable subgrade.
11. Vegetative cover shall be established on all disturbed areas in accordance with the recommendations of the Division Roadside Environmental Engineer.
12. Proper temporary and permanent measures shall be used to control erosion and sedimentation in accordance with all local, State and Federal regulations.
13. All materials and workmanship shall conform to the N. C. Department of Transportation's Standards and Specifications Manuals.
14. Strict compliance with the Policies and Procedures for Accommodating Utilities on Highway Rights of Way manual shall be required.
15. **REVISIONS are shown in RED on the attached plans.**
16. Any drainage structure disturbed or damaged shall be restored to its original condition as directed by the District Engineer.
17. All driveways altered during construction shall be returned to a state comparable with the condition of the driveways prior to construction.
18. Right of Way monuments disturbed during construction shall be referenced by a registered Land Surveyor and reset after construction.
19. The party of the second part agrees to provide traffic control devices, lane closures, road closures, positive protection and/or any other warning or positive protection devices necessary for the safety of road users during construction and subsequent maintenance. This shall be performed in conformance with the latest NCDOT Roadway Standard Drawings and Standard Specifications for Roads and Structures and amendments or supplements thereto. When there is no guidance provided in the NCDOT Roadway Standard Drawings and Standard Specifications for Roads and Structures, comply with the Manual on Uniform Traffic Control Devices for Streets and Highways and amendments or supplements thereto. Information as to the above rules and regulations may be obtained from the NCDOT Division Engineer.
20. All lanes of traffic are to be open during the hours of 6:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 6:00 P.M., or as designated by the District Engineer. Traffic will be maintained at all times.
21. Ingress and egress shall be maintained to all businesses and dwellings affected by the project. Special attention shall be paid to police and fire stations, fire hydrants and hospitals.

22. Any work requiring equipment or personnel within 5' of the edge of any travel lane of an undivided facility and within 10' of the edge of any travel lane of a divided facility shall require a lane closure with appropriate tapers.
23. During non-working hours, equipment shall be parked as close to the right of way line as possible and be properly barricaded in order not to have any equipment obstruction within the Clear Recovery Area
24. All roadway signs that are removed due to construction shall be reinstalled as soon as possible.
25. Excavation material shall not be placed on the pavement. Drainage structures shall not be blocked with excavation materials.
26. All temporary and final pavement markings are the responsibility of the encroaching party. Final pavement markings and sign plans shall be submitted to the Division Traffic Engineer at telephone (919) 220-4600 for review and approval.
27. The NCDOT Hydraulics Unit has reviewed the proposed drainage and it appears to be acceptable.
28. The Pavement Management Unit, Traffic Control Unit, Utilities Section, Roadway Design Unit-Special Studies Section, and the Congestion Management Unit have reviewed this encroachment and find it acceptable.
29. The pavement widening shall be paint-striped to provide the motorists with delineation and guidance through this area. Contact Division Traffic Engineer Mr. Steve Johnson at (919) 220-4600 regarding the specifications of the paint striping.
30. Concrete curb and gutter shall be constructed in accordance with Standard Drawing No. 846.01 (See Attachment # 1)
31. Aggregate Base Course shall be placed under the proposed curb and gutter in accordance with the attached Figure 1-3E, E-4. (See Attachment # 2).
32. Curb cuts and ramps shall be constructed in conformance with the N.C Department of Transportation Guidelines for Curb Cuts and Ramps for Handicapped Persons manual, Standard Drawing No. 848.01 and 848.05. (See Attachment # 3).
33. Berm widths shall be constructed in conformance with Figure 1-7D, F-1. (See Attachment # 4).
34. All existing utilities which do not meet the requirements of the Policies and Procedures for Accommodating Utilities on Highway Rights of Way manual with respect to minimum bury or material for use under pavement shall be relocated to the right of way line.
35. During periods of construction inactivity, place approved traffic control drums 3 feet minimum from the existing travel way.

36. Minimum sidewalk thickness is to be 4 inches and constructed in accordance with Standard Drawing No. 848.01 (See Attachment # 5).
37. NCDOT standard drawings are to be used unless other reference details are more conservative than those of NCDOT.
38. On sheet numbers PSH-2 of 2 and PMP -2 of 2, the lane configuration does not match the signal plans. (Noted in RED)
39. **No signals or signal related equipment shall be installed until a final review has been completed by and approval received from the Signals and Geometrics Unit. The Signals and Geometrics Unit are currently waiting on resubmittals. The required resubmittals should be sent directly to the Signals and Geometrics Unit. Upon satisfactory review and approval, Signals and Geometrics will forward the approved resubmittals to the District Engineer, who in turn will forward copies to the City of Durham for construction purposes and to the Utility Coordination Unit for their files.**

**National Pollutant Elimination System (NPDES)
Stormwater Permit Compliance Certification**

I Edward R. Venable, a duly authorized representative of
the City of Durham, an industrial/commercial/residential
facility requesting attachment to a North Carolina Department of Transportation
highway drainage system at Main Street in
Durham County, do hereby certify the following:

Check appropriate box and circle type of facility

- ☒ The Industrial / Commercial / Residential facility does not require an NPDES stormwater permit.
- ☐ The Industrial / Commercial / Residential facility does require an NPDES stormwater permit. The permit has been obtained and a Stormwater Pollution Prevention Plan (SPPP) is in place. Appropriate structural stormwater best management practices (BMP) are designed and installed as required by the Department of Environment and Natural Resources (DENR) and/or the local governing agency. All structural stormwater BMP's are located outside of NCDOT right-of-way.

I understand if the Department of Transportation determines the facility is not in compliance with NPDES stormwater requirements, the Department will report the noncompliance to the DENR Division of Water Quality. I also understand that falsification of this certification may result in penalty of law against the facility and me as prescribed in the North Carolina General Statutes.

Signature: Edward R. Venable

Date: January 24, 2008

Note: If the applicant has a question as to whether an NPDES stormwater permit is required, he or she may contact the N.C. Division of Water Quality in Raleigh at (919) 733-5083 (ask for Stormwater and General Permits Unit).

ROUTE US-70 Business and PROJECT West Village Street COUNTY OF STATE OF NORTH CAROLINA
SR 1445 Improvements Durham

DEPARTMENT OF TRANSPORTATION

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR
CURB AND GUTTER, PAVEMENT WIDENING AND
STORM DRAINAGE

-AND-
City of Durham

101 City Hall Plaza, Durham, NC 27701

THIS AGREEMENT, made and entered into this the 5th day of Nov, 20 08, by and between the Department
of Transportation, party of the first part; and the City of Durham party of the second part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as
Route(s) US-70 Bus East (Main Street), SR 1445 (Duke Street), and US-70 Bus West (Morgan Street), located US-70 Bus East from SR 1445 to SR 1380 (Great
Jones Street), on SR 1445 from SR 1127 (West Chapel Hill Street) to NC-70 Bus West and on US-
70 Bus East from SR 1445 to 700' east

with the construction and/or erection of: grading, drainage, paving, curb and gutter, sidewalk, signing, signals, traffic control,
pavement marking, and landscaping as shown on the attached plans

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of
the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the
right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right
and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are
made a part hereof upon the following conditions, to wit:

That the said party of the second part binds and obligates himself to install the encroaching facility in such safe
and proper condition that it will not interfere with or endanger travel upon said highway.

That the party of the second part agrees to provide during construction proper signs, signal lights, flagmen and
other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control
Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and
regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all
damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility
for any damage that may be caused to such facilities, within the highway rights of way limits, in carrying out its
construction.

That the party of the second part agrees to restore all areas disturbed during construction to the satisfaction of the
Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable
precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes,
reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be
compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North
Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities
and other official agencies relating to pollution prevention and control. When any construction operation disturbs the
ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or
otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be
necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the encroaching site, at all times during construction,
a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part
reserves the right to stop all work unless evidence of approval can be shown.

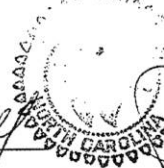

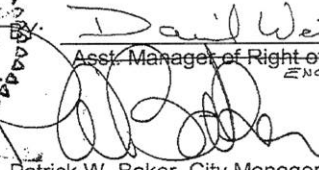
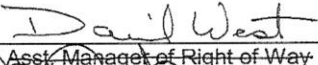
Provided the work contained in this agreement is being performed on a completed highway open to traffic; the
party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all
work contained herein has been completed. Unless specifically requested by the party of the first part, written notice
of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of
the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the
right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

R/W (161B) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (161B) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

ATTEST OR WITNESS:    
D. Ann Gray City Clerk
101 City Hall Plaza, Durham NC 27701
Patrick W. Baker, City Manager
101 City Hall Plaza, Durham NC 27701
Second Party
DEPARTMENT OF TRANSPORTATION
Assk. Manager of Right of Way
ENCROACHMENT AGENT
11/9/07

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the Manager of Right of Way. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

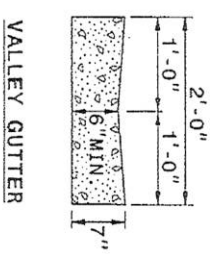
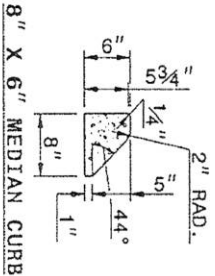
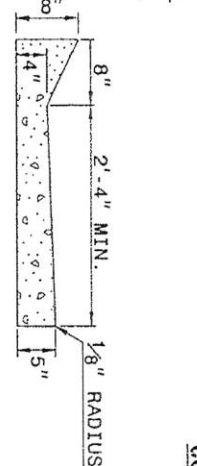
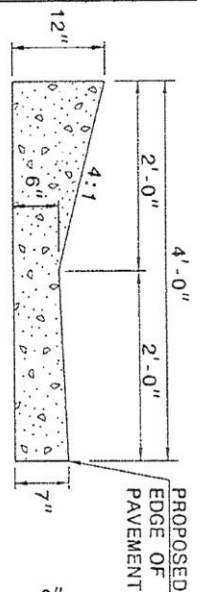
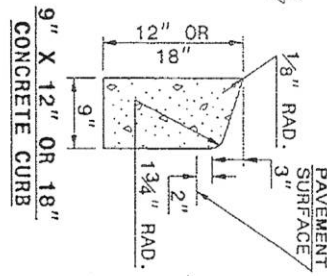
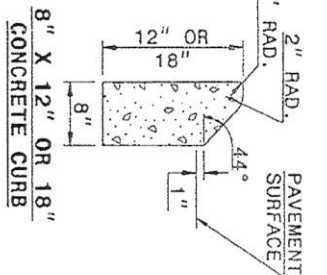
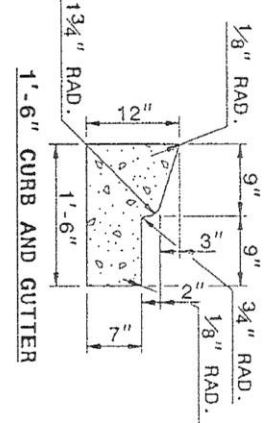
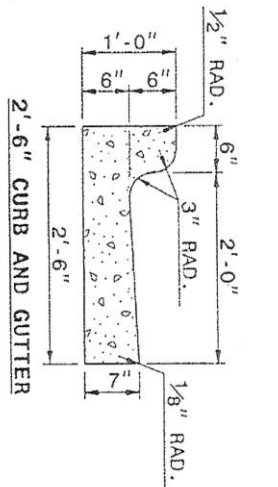
When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the proposed encroachment.
4. Length and type of encroachment.
5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
6. Drainage structures or bridges if affected by encroachment.
7. Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
8. Horizontal alignment indicating general curve data, where applicable.
9. Vertical alignment indicated by percent grade, P.I. station and vertical curve length, where applicable.
10. Amount of material to be removed and/or placed on NCDOT right of way, if applicable.
11. Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
12. All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
13. Erosion and sediment control.
14. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
15. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.
16. Method of handling traffic during construction where applicable.
17. Scale of plans, north arrow, etc.

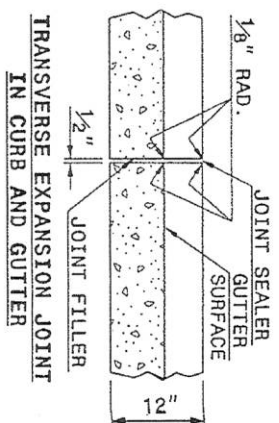
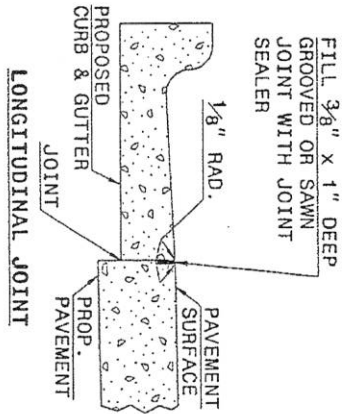
7-06

ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER
AND CURB & GUTTER



SECTION VIEW OF CURBS OR CURBS AND GUTTERS

GENERAL NOTES:
-PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
-JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
-CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS.
-CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1 1/2" DEEP.
-FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
-SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



SECTION VIEW OF JOINTS

McMaster

7-06

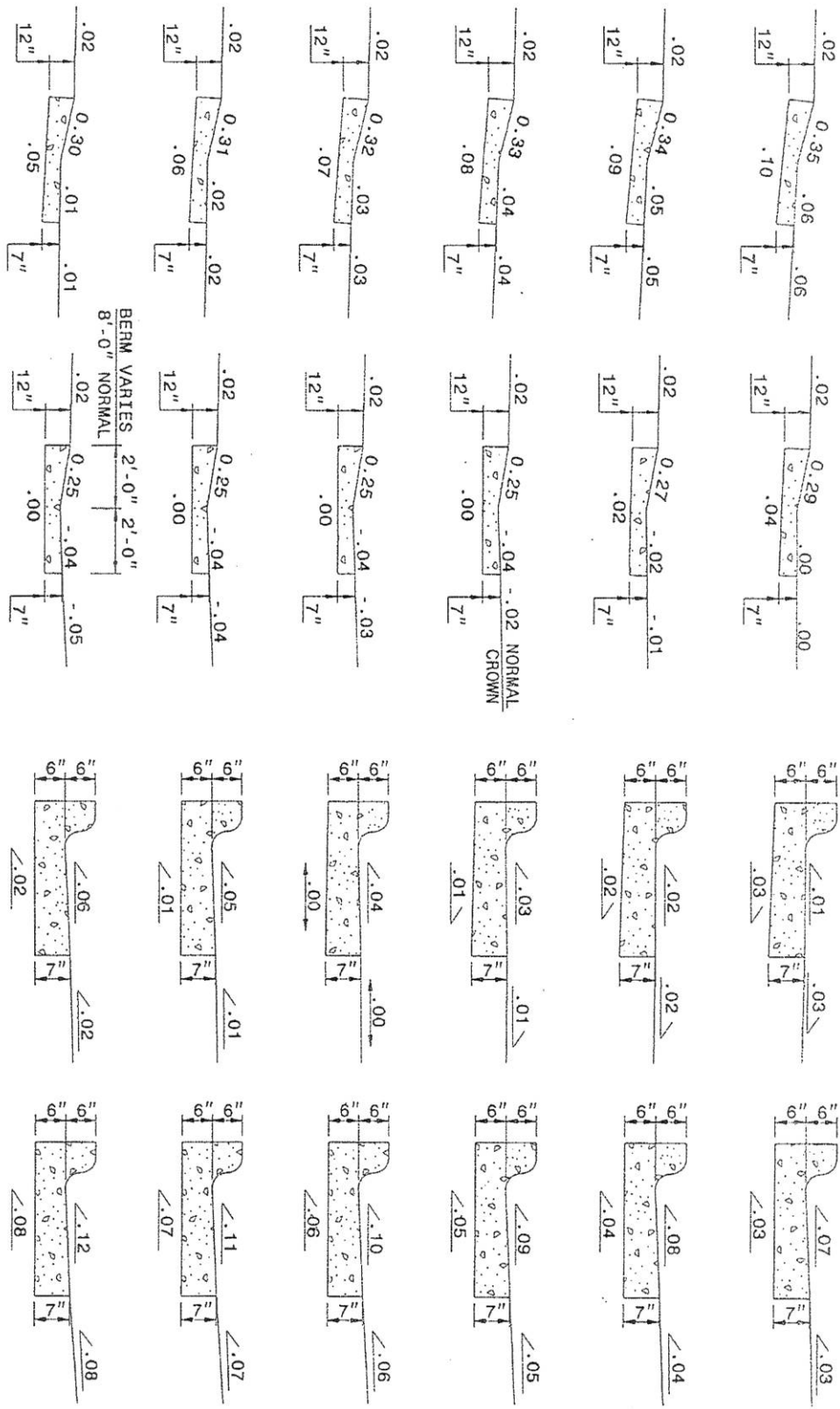
ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER
AND CURB & GUTTER

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER
AND CURB & GUTTER

SHEET 2 OF 3
846-01



STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

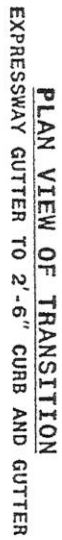
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ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER
AND CURB & GUTTER

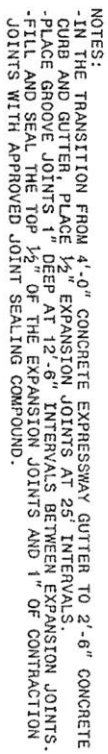
SHEET 2 OF 3
846-01



PLAN VIEW OF TYPICAL CURB AND GUTTER OCCURRENCES



PLAN VIEW OF TRANSITION
EXPRESSWAY GUTTER TO 2'-6" CURB AND GUTTER



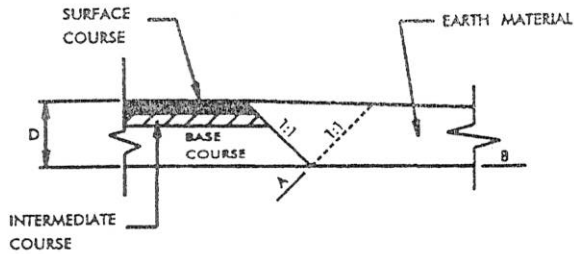
ROADWAY DESIGN MANUAL

PART I

PAVEMENT EDGE CONSTRUCTION

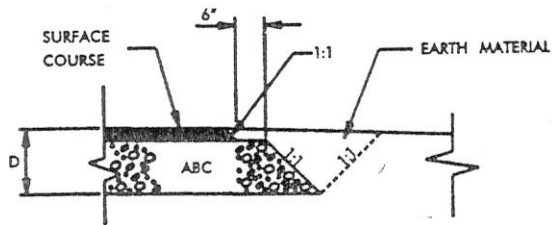
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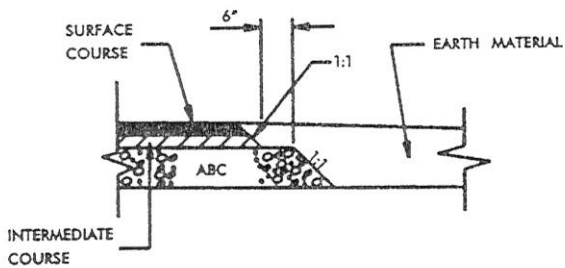
ALL ASPHALT

E-1

A TRENCH SECTION
WHEN $D=10'$ OR LESSB GRADED SECTION
WHEN $D=OVER 10'$ 

AGGREGATE BASE

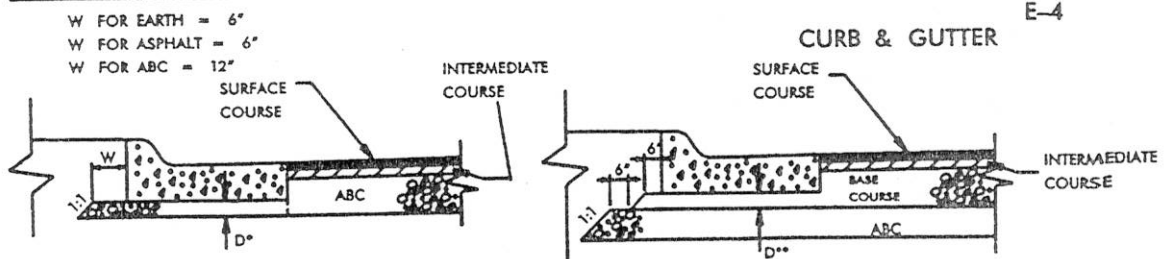
E-2

TRENCH SECTION
WHEN $D=10'$ OR LESS

AGGREGATE BASE

E-3

GRADED SECTION



CURB & GUTTER

E-4

W FOR EARTH = 6"
 W FOR ASPHALT = 6"
 W FOR ABC = 12"

* WHEN D IS LESS THAN 3' THE CURB & GUTTER WILL BE PLACED ON SUBGRADE.** ASPHALT BASE - HB IS TO BE USED UNDER CURB & GUTTER WHEN $D=2\frac{1}{2}'$ OR MORE.

7-06

ENGLISH STANDARD DRAWING FOR
CONCRETE SIDEWALK

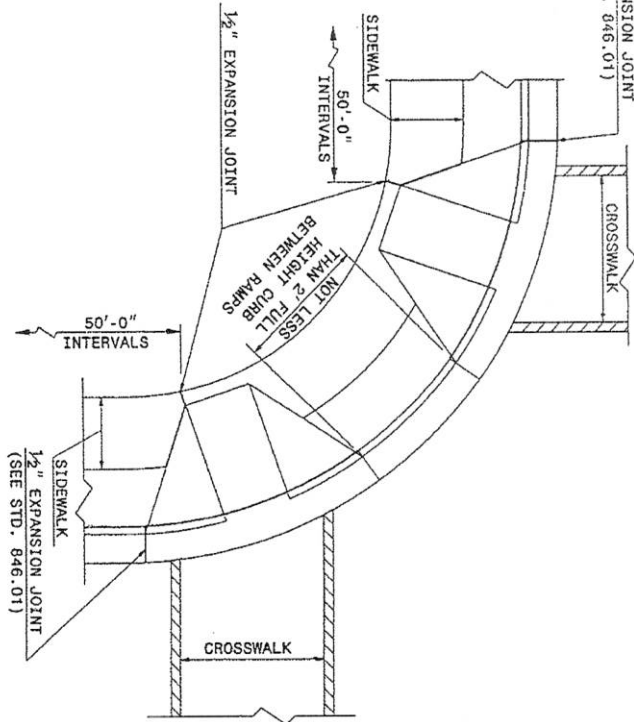
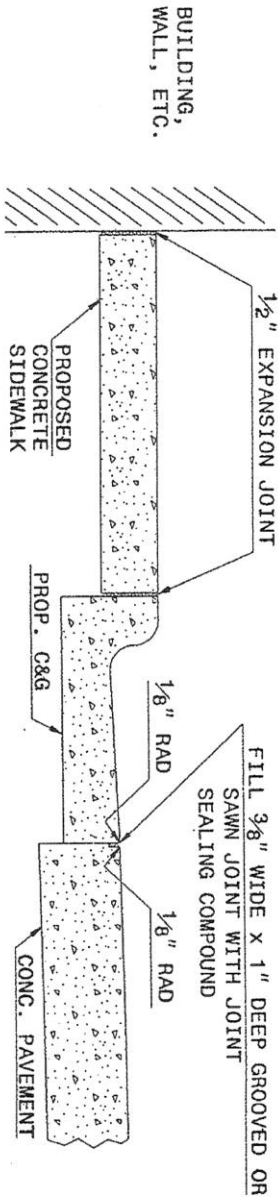
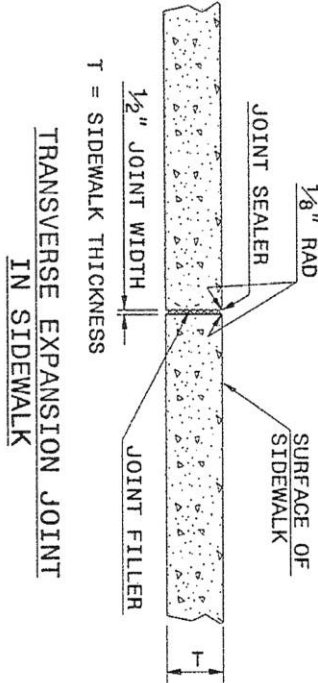
SHEET 1 OF 1
848.01

NOTES:

CONSTRUCT STANDARD SIDEWALK 5' WIDE AND
4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

PLACE A GROOVE JOINT 1" DEEP WITH 1/8" RADIUS
IN THE CONCRETE SIDEWALK AT 5' INTERVALS.
ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT 50'
INTERVALS. A 1/2" EXPANSION JOINT WILL BE REQUIRED
WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.

SEE STD. DWG. 848.05 FOR WHEELCHAIR RAMP LOCATION
REQUIREMENTS AND CONSTRUCTION GUIDELINES.



CURB CUT

SHEET 1 OF 4
848.05

[illegible]

2'-0" LENGTH

1'-0" WIDTH

KNOX WITH AREA IS VARIABLE

[illegible]

B = $X \cdot (A+9)$
B = DISTANCE FROM FRONT EDGE OF SIDEWALK
TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL
SIDEWALK SLOPES.
* BACK OF SIDEWALK DROP REQUIRED FOR

	W	A	W+A ²	X	B
6	5.0	5.6	6.8	5.0*	
6	0.0	6.8	6.8	6.0**	
7	0.0	7.6	7.3	6.5***	
8	0.0	8.6	7.3	6.5***	
5	2.0	7.6	7.8	5.0	
5	2.5	8.3	8.1	4.8	
5	3.0	8.3	8.3	4.4	
5	3.5	9.3	8.4	4.1	
5	4.0	9.8	8.6	3.8	
5	4.5	10.3	8.7	3.4	
6	5.0	10.8	8.8	3.1	

B = $X - (A + 9)$
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.

Technical drawing of a utility shaft cross-section. The drawing shows a shaft with a diameter of 3' R. and a height of 6". Inside the shaft, there is a utility strap with a width of 2" and a height of 6". The strap is supported by a 12:1 MAX. RAMP. The shaft is divided into three sections: A, B, and C. Section A is the top section, Section B is the middle section, and Section C is the bottom section. The shaft is labeled with dimensions and materials: 3' R. (STEEL), 6" (CONCRETE), 2" (UTILITY STRAP), 6" (UTILITY STRAP), 12:1 MAX. RAMP, and 3' R. (STEEL). The drawing also shows a cross-section of the shaft with a diameter of 3' R. and a height of 6". The shaft is labeled with dimensions and materials: 3' R. (STEEL), 6" (CONCRETE), 2" (UTILITY STRAP), 6" (UTILITY STRAP), 12:1 MAX. RAMP, and 3' R. (STEEL). The drawing also shows a cross-section of the shaft with a diameter of 3' R. and a height of 6". The shaft is labeled with dimensions and materials: 3' R. (STEEL), 6" (CONCRETE), 2" (UTILITY STRAP), 6" (UTILITY STRAP), 12:1 MAX. RAMP, and 3' R. (STEEL).

3' R.
6"
UTILITY STRAP
A
2" DETACHABLE
0.02 (MIN.)
0.04 (MAX.)
0.04 (NOM.)
0.01 (MIN.)
0.04 (MAX.)
0.02 (NOM.)
B
12:1 MAX. RAMP
C
3' R.
6"
STEELWALK (5 STD.)
X
SECTION B-B
SECTION A-A
SIDEWALK ELEVATION
6'-0" CURB
3'-4" WALK
6'-0" CURB
TRANSITION
TRANSITION
TOP OF CURB
GUTTER
VARIABLE SLOPES NOT TO EXCEED 12:1 (8-3%)

Figure 1: Typical cross section of a road. The diagram shows a road cross-section with various layers and slopes. From top to bottom, the layers are: 1. A top layer with a width of 3'-0". 2. A layer labeled "DRAIN" with a width of 3'-0". 3. A layer labeled "TRANSITION" with a width of 3'-0". 4. A layer labeled "CUB" with a width of 3'-0". 5. A layer labeled "TRANSITION" with a width of 3'-0". 6. A bottom layer labeled "CUB" with a width of 3'-0". The road is flanked by "SLOPE" on both sides. The left slope is labeled "TO EXCEED 12:1 (8.33%)". The right slope is labeled "TO EXCEED 12:1 (8.33%)". The bottom of the road is labeled "GUTTER". The top of the road is labeled "TOP OF".

EXPANSION JOINT
(SEE STD. 846.01)

NOTE: A PORTION OF ONE OR BOTH RAAPS
MAY EXTEND OUTSIDE THE RETURN.

[illegible]

PLAN VIEW
DUAL RAMPS
ANY RADIUS
(40" MIN. FLOOR WIDTH)

ANY RADI
(40" MIN. FLOOR WIDTH)

SHEET 1 OF 4
848.05

WHEELCHAIR RAMP
CURB CUT

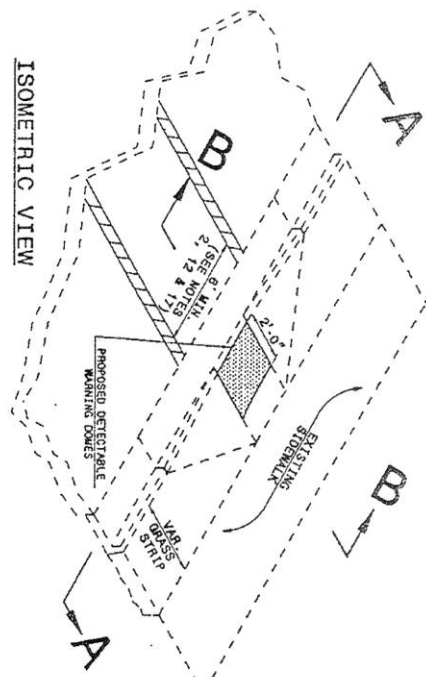
7-06

7-06 STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

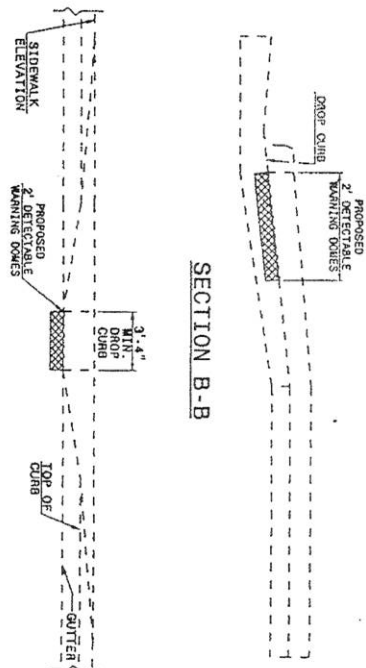
7-06

ENGLISH STANDARD DRAWING FOR
RETROFITTING DETECTABLE WARNING DOMES
ONTO EXISTING WHEELCHAIR RAMP
CURB CUT

SHEET 2 OF 4
848.05



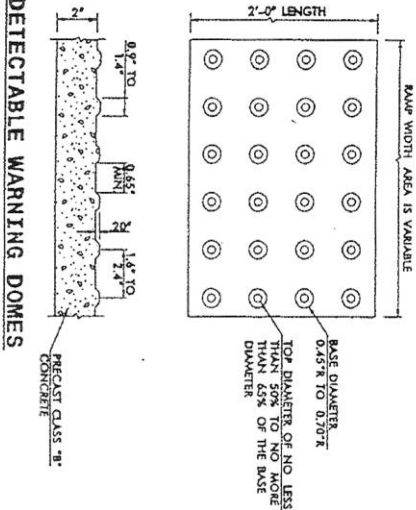
ISOMETRIC VIEW



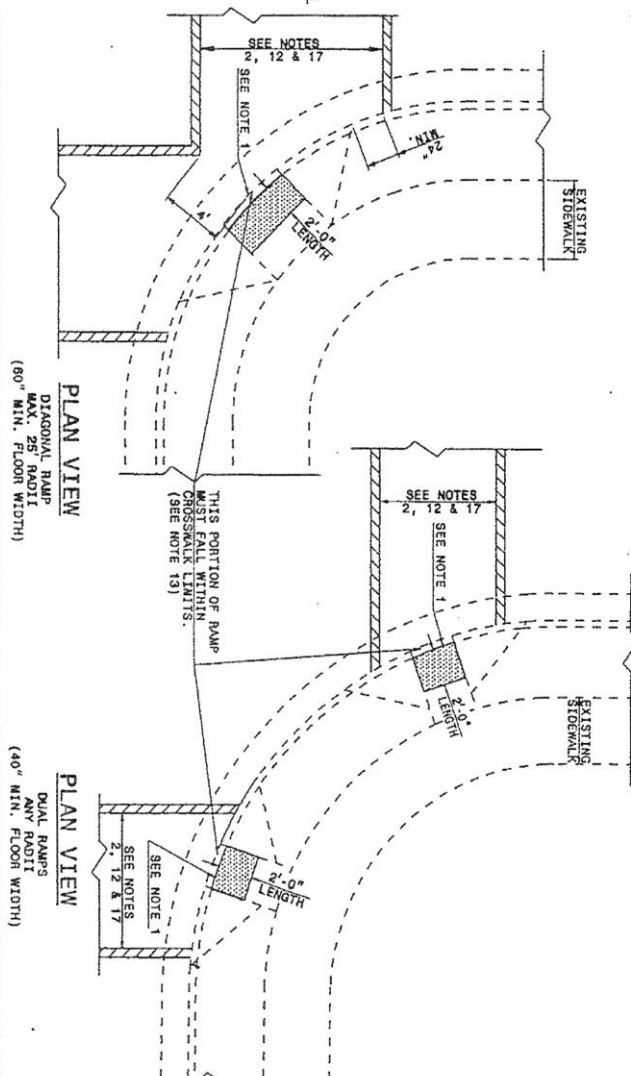
SECTION B-B

SECTION A-A

- NOTES:
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
 2. OBTAIN 70% CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING DOMES



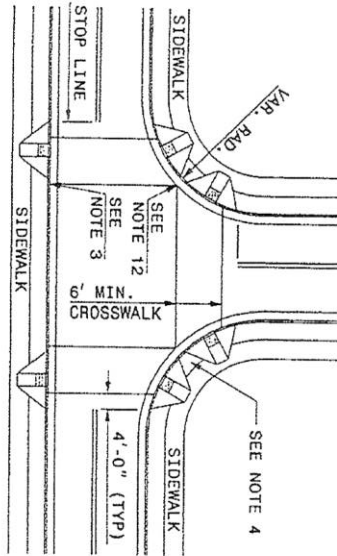
PLAN VIEW
DIAGONAL RAMP
MAX. 25' FLOOR WIDTH
(90° MIN. FLOOR WIDTH)

PLAN VIEW
FLAT RAMP
MAX. 25' FLOOR WIDTH
(90° MIN. FLOOR WIDTH)

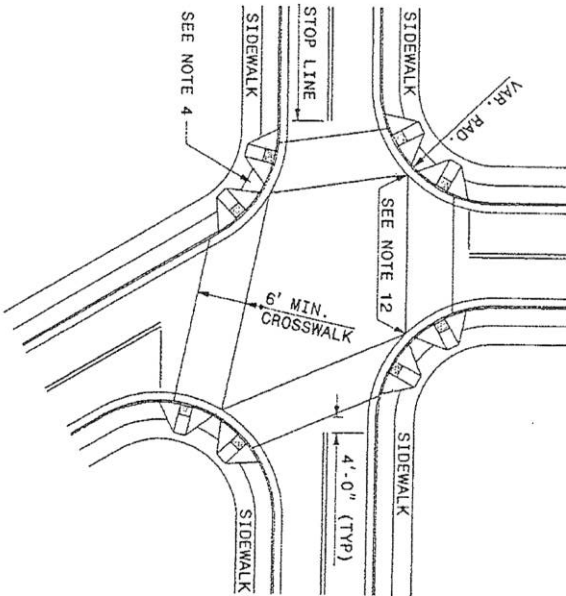
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ENGLISH STANDARD DRAWING FOR
WHEELCHAIR RAMP
CURB CUT

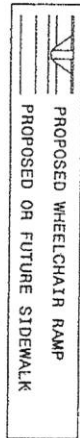
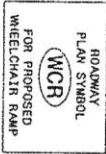
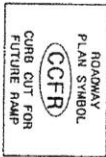
SHEET 3 OF 4
848.05



DETAIL SHOWING TYPICAL LOCATION OF WHEELCHAIR RAMPS,
PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS



DETAIL SHOWING TYPICAL LOCATION OF WHEELCHAIR
RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES



ALLOWABLE LOCATIONS
..... ANY

7-06

ENGLISH STANDARD DRAWING FOR
WHEELCHAIR RAMP
CURB CUT

SHEET 3 OF 4
848.05

7-06

ENGLISH STANDARD DRAWING FOR

WHEELCHAIR RAMP

CURB CUT

SHEET 4 OF 4
848.05

NOTES:

1. CONSTRUCT THE WALKING SURFACE WITH SLIP RESISTANCE AND A 70% CONTRASTING COLOR TO THE SIDEWALK.
2. CROSSWALK WIDTHS AND CONFIGURATION VARY BUT MUST CONFORM TO TRAFFIC DESIGN STANDARDS.
3. NORTH CAROLINA GENERAL STATUTE 136-44.14 REQUIRES THAT ALL STREET CURBS BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY DISABLED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTER AND SIDEWALKS ARE PROVIDED AND AT OTHER POINTS OF PEDESTRIAN FLOW.
- IN ADDITION, SECTION 228 OF THE 1973 FEDERAL AID HIGHWAY SAFETY ACT REQUIRES PROVISION OF CURB RAMPS ON ANY CURB CONSTRUCTION AFTER JULY 1, 1976 WHETHER A SIDEWALK IS PROPOSED INITIALLY OR IS PLANNED FOR A FUTURE DATE.
- THE AMERICANS WITH DISABILITIES ACT (ADA) OF 1990 EXTENDS TO INDIVIDUALS WITH DISABILITIES. COMPREHENSIVE CIVIL RIGHTS PROTECTIONS SIMILAR TO THOSE PROVIDED TO PERSONS ON THE BASIS OF RACE, SEX, NATIONAL ORIGIN AND RELIGION UNDER THE CIVIL RIGHTS ACT OF 1964. THESE CURB RAMPS HAVE BEEN DESIGNED TO COMPLY WITH THE CURRENT ADA STANDARDS.
4. PROVIDE WHEELCHAIR RAMPS AT LOCATIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATE WHEELCHAIR RAMPS AS DIRECTED BY THE ENGINEER WHERE EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. AFFECT PLACEMENT. WHERE TWO RAMPS ARE INSTALLED PLACE NOT LESS THAN 2 FEET OF FULL HEIGHT CURB BETWEEN THE RAMPS. PLACE DUAL RAMPS AS NEAR PERPENDICULAR TO THE TRAVEL LANE BEING CROSSED AS POSSIBLE.
5. PAY FOR ALL VARIABLE DEPTH CONCRETE USED FOR CONSTRUCTION OF WHEELCHAIR RAMPS AS CONCRETE WHEELCHAIR RAMPS. (SQ. YDS.)
6. PAY FOR ALL DEPRESSED CURBS AT WHEELCHAIR RAMPS AS THE TYPE CURB AND GUTTER USED ADJACENT TO DEPRESSED CURB. (LN. FT.)
7. SUCH PRICES AND PAYMENTS IS CONSIDERED FULL COMPENSATION FOR ALL MATERIALS, LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO SATISFACTORILY COMPLETE THE WORK.
8. DO NOT EXCEED 0.09 (12:1) SLOPE ON THE WHEELCHAIR RAMP IN RELATIONSHIP TO THE GRADE OF THE STREET.
9. CONSTRUCT WHEELCHAIR RAMPS 40" (3'-4") OR GREATER FOR DUAL RAMPS.
10. USE CLASS "B" CONCRETE WITH A SIDEWALK FINISH IN ORDER TO OBTAIN A ROUGH NON-SKID TYPE SURFACE.
11. PLACE A 1/2" EXPANSION JOINT WHERE THE CONCRETE WHEELCHAIR RAMP JOINS THE CURB AND AS SHOWN ON STD. DWG. 848.01.
12. PLACE THE INSIDE PEDESTRIAN CROSSWALK LINES NO CLOSER IN THE INTERSECTION BY BISECTING THE INTERSECTION RADIUS, WITH ALLOWANCE OF A 4' CLEAR ZONE IN THE VEHICULAR TRAVELWAY WHEN ONE RAMP IS INSTALLED. (SEE NOTE 17)
13. COORDINATE THE CURB CUT AND THE PEDESTRIAN CROSSWALK LINES SO THE FLOOR OF THE WHEELCHAIR RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES. PLACE DIAGONAL RAMPS WITH FLARED SIDES SO 24" OF FULL HEIGHT CURB FALLS WITHIN THE CROSSWALK MARKINGS ON EACH SIDE OF THE FLARES.
14. CONSTRUCT THE PEDESTRIAN CROSSWALK A MINIMUM OF 6 FEET. A CROSSWALK WIDTH OF 10 FEET OR GREATER IS DESIRABLE.
15. USE STOP LINES, NORMALLY PERPENDICULAR TO THE LANE LINES, WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL, STOP SIGN OR OTHER LEGAL REQUIREMENT. AN UNUSUAL APPROACH SKEW MAY REQUIRE THE PLACEMENT OF THE STOP LINE TO BE PARALLEL TO THE INTERSECTING ROADWAY.
16. TERMINATE PARKING A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
17. PLACE ALL PAVEMENT MARKINGS IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION AND THE NORTH CAROLINA SUPPLEMENT TO THE MUTCD.

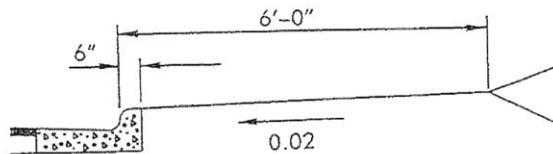
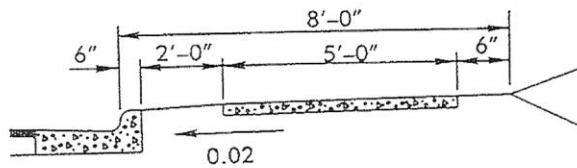
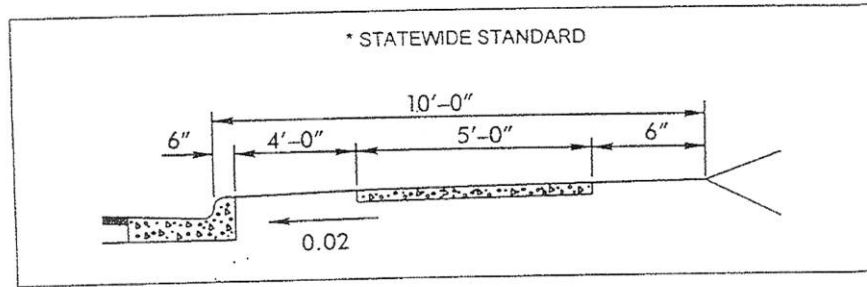
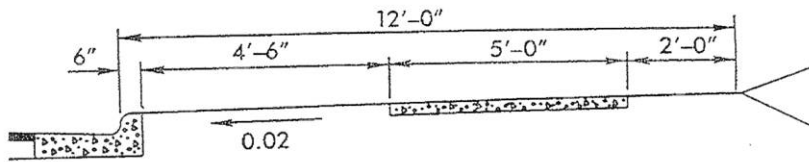
ENGLISH STANDARD DRAWING FOR

WHEELCHAIR RAMP

CURB CUT

SHEET 4 OF 4
848.05

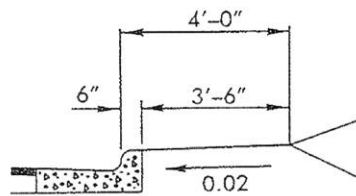
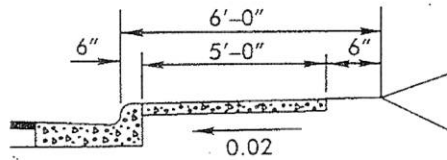
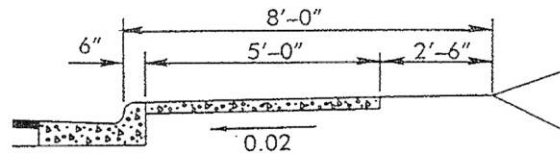
DESIRABLE BERM WIDTHS



~~PROVIDE A CLEAR AREA OF
6' DESIRABLE (MEASURED FROM FACE) OR
4' MINIMUM (MEASURED FROM FACE)~~

* STATEWIDE STANDARD SHOULD BE USED ON PROJECTS WHERE SIDEWALKS ARE PROPOSED. MORE NARROW BERMS MAY BE USED ON PROJECTS WITH RIGHT-OF-WAY RESTRICTIONS OR TERRAIN CONSTRAINTS. WIDER BERMS MAY BE NEEDED AT GUARDRAIL LOCATIONS (SEE STD. 362.01, SHEET 11 OF 11).

MINIMUM BERM WIDTHS



~~PROVIDE A CLEAR AREA OF
6' DESIRABLE (MEASURED FROM FACE) OR
4' MINIMUM (MEASURED FROM FACE)~~

Proposed Revision 5/12/05

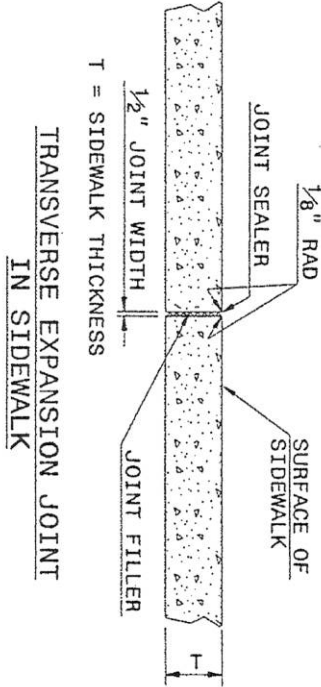
7-06

ENGLISH STANDARD DRAWING FOR
CONCRETE SIDEWALK

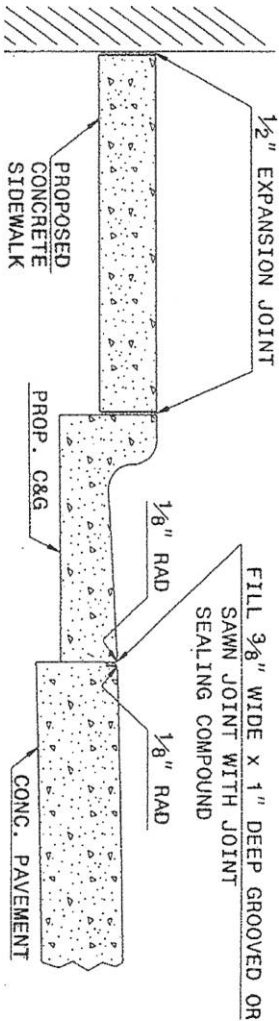
SHEET 1 OF 1
848.01

NOTES:

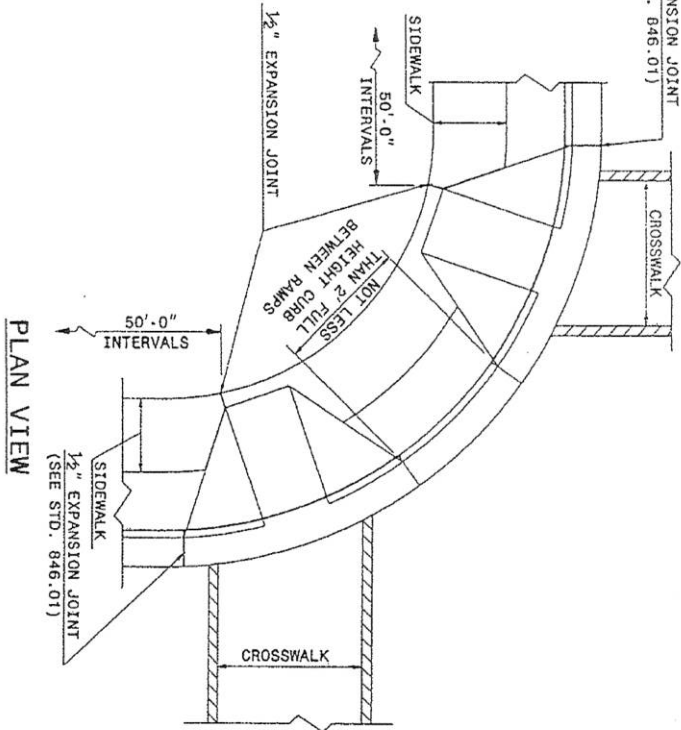
CONSTRUCT STANDARD SIDEWALK 5' WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS. PLACE A GROOVE JOINT 1" DEEP WITH $\frac{1}{8}$ " RADI IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE $\frac{1}{2}$ " EXPANSION JOINT WILL BE REQUIRED AT 50' INTERVALS. A $\frac{1}{2}$ " EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE. SEE STD. DWG. 848.05 FOR WHEELCHAIR RAMP LOCATION REQUIREMENTS AND CONSTRUCTION GUIDELINES.



BUILDING,
WALL, ETC.



DETAILS SHOWING JOINTS IN CONCRETE SIDEWALK



PLAN VIEW

McQuay-Norris